NSLS X-Ray Bending Magnet Scatter Calculations

6mrad horizontal and 0.8mrad full vertical beam size
Compton Scattering at 90E and 1m from Scatter Point
Estimated Dose values in millirads/hour into human tissue equivalent (ICRU4)

	Ring Conditions		
Scatterers and Shielding	2.5GeV @ 500mA	2.8GeV @ 300mA	3.0Gev @ 240mA
10mil Be Window Scattering			
thru 20mil Stainless Bellows	480	1170	2610
+ 1/16" Pb Shielding	1.2E-03	1.7E-2	.13
+ 1/8" Pb Shielding	5.7E-06	1.3E-4	1.3E-3
+ 3/16" Pb Shielding	-	2.1E-6	2.4E-5
+ 1/4" Pb Shielding	-	-	5.3E-7
Si Monochromator Scattering			
thru 1/8" Stainless Tank	38	265	1310
+ 1/16" Pb Shielding	1.8E-2	.32	2.9
+ 1/8" Pb Shielding	1.5E-4	3.6E-3	3.9E-2
+ 3/16" Pb Shielding	-	6.9E-5	7.9E-4
+ 1/4" Pb Shielding	-	-	1.8E-5
NSLS Hutch (1/8" Steel) with			
White Beam onto Al Plate	42	290	1440
+ 1/16" Pb Shielding	1.9E-2	.34	3.1
+ 1/8" Pb Shielding	1.6E-4	3.9E-3	4.1E-2
+ 3/16" Pb Shielding	-	7.3E-5	8.3E-4
+ 1/4" Pb Shielding	-	-	1.9E-5

"White Beam Hutches" will also be a significant radiation source at the higher electron energies and will require 1/8" to 3/16" thick lead sheet lining added to the existing steel sheet in order to achieve the desired shielding. Insertion device beam lines will also require individual attention from the point of view of scattered X-radiation.

Source:
K. Batchelor. March 1996. NSLS Upgraded Safety Analysis Document Including Operations Policies, Operational Safety Limits and Policy Changes. BNL 49214, Rev. 2, p. 13.